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In 1977, Jenkinson (*AMU Bulletin* for 1976:16–17) reported a diploid chromosome number of 38 for 15 North American naiad species. That research eventually included five or more counts from 41 North American naiad species, all of which had 38 as the modal diploid chromosome number. In addition, 26 other species-level taxa were represented by between one and four counted chromosome spreads, again with 38 the apparent diploid number. The constant 38 diploid number in North American species is identical to published reports for three European unionids (Van Griethuysen, Kiavta, and Butot. 1969. *Basteria* 33:51–56) and one Japanese margaritiferiid and two Japanese unionids [Nadamitsu and Kanai. *Bulletin of the Hiroshima Women's University* (1975) 10:1–3; (1978) 1–5.] but different from the 34 diploid number reported for three Australian hybrids (McMichael and Hiscock. 1958. *Australian Journal of Marine and Freshwater Research* 9:372–503).

Analysis of the comparison of arm ratios and percent total complement lengths of 79 measured chromosome spreads from 33 species produced a suggested overall mean karyotype, possible mean karyotypes for six previously-proposed suprageneric groups, and indications of relationships among the groups based solely on the chromosomal measurement data. While extensions of the results should be considered preliminary because of the small number of measured spreads for some groups, these data indicate that North American naiad fauna consist of a single evolutionary group, quite different from the polyphyletic arrangement proposed by Modell (1942. *Archiv fur Molluskenkunde* 74:161–191). The chromosomal relationships are most similar to the classification proposed by Ortmann (1912. Annals of the Carnegie Museum 8:222–365) and only slightly different from the classification proposed by Davis and Fulier (1981. *Malacologia* 20:217–253).

ONTOGENY OF THE LARVAL FOOT OF *CORBICULA FLUMINEA* (BIVALVIA: CORBICULIDAE). Louise Russert Kraemer, Department of Zoology, University of Arkansas, Fayetteville.

Dissemination of *Corbicula fluminea* (Müller), the Asian Clam, has been so rapid through the river systems of the U.S. in the past two decades that malacologists must confront the question, how? In this regard, locomotion of the larval stages and the free-living juveniles merits focused study. In the present investigation, microscopic serial sections, SEM, fresh-tissue dissection and microscopic videotaping were used. It was found that *C. fluminea* develops a characteristic, barrel-shaped trochophore larva, replete with apical tuft, which is retained within the marsupial gill. The longitudinal axis of the body rotates 90° as a pediveliger develops from the trochophore, and the foot anlage appears near the region of the apical tuft. Pediveligers typically are retained in the marsupial gills, where they develop into juveniles about 200 micrometers long. The juveniles exhibit clearly differentiated statocysts and a conspicuous sock-shaped foot that is very active in the substratum or in the water column. Sinuses of the juvenile foot are not well developed, and there is no "Hakenform," "Grabstritt," or "Schwellform" behavior, such as one sees in the adult clam. In contrast, the foot engages in vigorous, rapid maneuvers, comprised of extension, "hunching" (of the animal forward onto its extended foot), extension, etc. Alternatively, the comparatively large juvenile foot is quickly withdrawn completely within the shell valves. SEM examination of the foot revealed that it has a peculiar structure, comprised of a longitudinal series of membranous rings about 2 μm wide, which are joined to each other by loose connective tissue. It is quite evidently the "segmenting" rings of tissue that allow the rapid extension and telescoping withdrawal of the juvenile foot. This study indicates that there is structural basis for the distinctive form of pedal locomotion in the juvenile *C. fluminea*, a basis vastly different from that of the adult clam.

INDUCTION OF COLOR FORMS IN *CORBICULA*. Robert S. Prezant and **Kashane Chalermwat,** University of Southern Mississippi, Hattiesburg.

"White" forms of *Corbicula fluminea*, from Tallahala Creek, Mississippi, were maintained in the laboratory under four different environmental regimes. Specimens were kept for three months in aquaria at either 23°C or 31°C with or without the introduction of a mixed agal/protozoan supplement. Clams maintained at 31°C with a high organic content in surrounding waters produced internal shells with a pure white coloration. Microstructurally these white internal shells were composed of crossed acicular structure. All other regimes tested produced clams with purple highlighted internal shell colorations and "normal" crossed lamellar structures.

Lethargic, unhealthy or dying clams all showed a glossy white color and acicular microstructure. Empty valves collected from creek banks also show a crossed acicular microstructure but are dull white in internal coloration. Active, healthy clams maintain a purple highlighted internal shell color and typical corbiculacean internal shell microstructure. These results are of importance since recent reports of a purple and white morph are thought to have taxonomic value. It is unlikely that color or other morphometric features will prove to be of any systematic value in the determination of North American species of *Corbicula*. Many of the reported morphometric distinctions between or among populations of *Corbicula* in North America may be reflections of microhabitats.

DOES AMBIENT OXYGEN TENSION LIMIT THE DISTRIBUTIONS OF FRESHWATER SNAILS? Robert W. Hanley, The University of Alabama, Tuscaloosa.

This study examines the relationship between ambient oxygen tension (P_{O_2}) and metabolic rate (V_{O_2}) in freshwater snails, in order to determine whether some species are unable to exploit various habitats due to their metabolic response to declining oxygen tension. Laboratory and field data have been collected on eleven species of freshwater snails, from both lotic and lentic habitats with

differing oxygen availabilities. Metabolic rates were determined using a closed respirometer technique, in which oxygen consumption by the snails induced a progressive hypoxia.

At 15°C four of the species tested were found to have metabolic rates dependent on P_{O_2} (metabolic oxygen conformers); the other seven species had metabolic rates that were independent of P_{O_2} (metabolic oxygen regulators). At 25°C all of the species tested were metabolic oxygen regulators. Habitat was not correlated with the abilities to regulate V_{O_2}, a finding that is contrary to earlier investigations. The ability to regulate appeared to be morphologically based, with prosobranch species able to regulate V_{O_2} over a wider range of oxygen tensions and more perfectly than pulmonate species. Among the pulmonate species, the planorbids, which have hemoglobin in their blood, are better metabolic oxygen regulators than pulmonates that lack hemoglobin. This study demonstrates that freshwater snails in general are able to tolerate low ambient oxygen tensions, and therefore it is concluded that habitat selection in this group is not determined by oxygen availability.

ECOLOGY AND ZOOGEOGRAPHY OF SOME MAINLAND CHINESE *TRICULA* (GASTROPODA: PROSOBRANCHIA: POMATIOPSIDAE) TRANSMITTING SCHISTOSOMES. K. Elaine Hoagland,[1] Yuanhua Kuo,[2] George M. Davis,[3] Pulin Chen,[2] Hongmu Yang,[4] and **Deji Chen,[5]** [1]Academy of Natural Sciences of Philadelphia, and Lehigh University, Bethlehem, Pennsylvania; [2]Institute of Parasitic Diseases, Chinese Academy of Medical Sciences, Shanghai, P.R. China; [3]Academy of Natural Sciences of Philadelphia; [4]Yunnan Provincial Anti-Epidemic Station, Kunming, P.R. China; [5]Dali Anti-Schistosomiasis Institute, Xiaguan, Yunnan Province, P.R. China.

There are numerous species of *Tricula* and closely-related genera in Southern China and Southeast Asia. Based on previous work, we believed that both the number of taxa in Yunnan Province and the potential for these taxa to transmit mammalian schistosomes were underestimated. This was the case. We found eight species of *Tricula* (delineated anatomically) in the areas of Dali, Kunming, and Jinghong. Although never sympatric congeners, species of *Tricula* lived with closely-related genera at three localities.

One large (7–8 mm) species of *Tricula* lived on stones in a creek and in a culvert draining into Dianchi Lake, with a few specimens in the lake itself. This species differed from other *Tricula* in being able to withstand polluted water with high silt burden. It carried no schistosomes. The other species of *Tricula*, all ~ 3 mm long, lived in mountain springs or tiny creeks and pools below springs. They were found in gently-flowing, clean, cool water. Some individuals were amphibious, but most were in flowing water, if only a hillside seepage. The snails were on undersides of leaves and stones, and on the mud itself. Associated fauna often included *Gyraulus, Radix, Sphaerium*, insect larvae, flatworms, and leeches.

Tricula was never in stagnant water or streams larger than ½ meter wide. Habitats were highly localized, small, and isolated yet permanent, perhaps accounting for high speciation in the geographically-widespread genus.

Forked-tail mammalian-type schistosomes infected three species of *Tricula*. Many of the snail habitats, in canyons where there was natural vegetation, suggest that rats could be the final host. Humans may come into contact when obtaining water for domestic use. Chinese *Tricula* is ecologically similar to *Tricula* in Burma, India, and to a related genus in Malaysia that transmits human schistosomes. If the Chinese snails transmit human schistosomes, transmission patterns differ from those of *Oncomelania hupensis*, the amphibious snail transmitting *Schistosoma japonicum* that is associated with irrigation ditches in much of Southern Asia.

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THE LIMPET GENUS *BRONDELIA* AMONG THE FRESHWATER GASTROPODS. J. B. Burch, Smithsonian Institution, Washington, D.C.

Bourguignat (1853 [1854] *Proceedings of the Zoological Society of London,* (21): 92) described a curious limpet-like gastropod, *Ancylus drouetianus,* from the Cuming collection. The shells lacked any indication of a locality, but Bourguignat believed them to be from North America. The shells were peculiar in that they were decorated with a number of radiating reddish stripes, and because of the apex: "mamillato, minutissimo, coarctato, *adpresso, recurvo (culmine 1, 2 spiraliter laterali),* mediano, postico" [italics mine] (Bourguignat, 1862, *Revue et Magasin de Zoologie,* ser. 2, 14: 20). Bourguignat received additional specimens from Algeria and, in the latter publication, named a new genus for the snail, *Brondelia*, clearly differentiating it from *Ancylus*. In the same paper, Bourguignat named a second species, *Brondelia gibbosa*. This species also "a été recueillie sur des rochers humides, dans l'intérieur de la forêt de l'Édough, prés de Bone, en Algérie."

In June 1973, I traveled to Algeria with two assistants to collect in the Édough Forest near Bône (Annaba). The forest was not overly disturbed by human activities, the snail habitats were good, and various snail species were collected with little difficulty. We were able to collect widely in the area. But, after several full days of searching, no gastropods resembling *Brondelia* were found (see Brown, 1980, *Freshwater Snails of Africa and Their Medical Importance,* Taylor & Francis, London, p. 143).

Because of the failure to find *Brondelia* at the only specific locality ascribed to either of its two species, I became suspicious about the identity of this supposed ancylid. On inspecting Bourguignat's specimens a short time later from the Muséum d'Histoire naturelle, Geneva, it was obvious that *Brondelia drouetiana* was a species of the siphonariid genus *Williamia* Monterosato. On comparing Bourguignat's specimens with specimens of *Williamia* in the Muséum National d'Histoire naturelle, Paris, it was clear that *Brondelia drouetiana* was identical to *Williamia gussonii* (Costa).

Since *Williamia* Monterosato 1884 (type species: *An-*